DIARRHEAL ILLNESS AND HEALTH INFORMATION NEEDS OF INTERNATIONAL TOURISTS IN KOH LANTA DISTRICT, KRABI PROVINCE

MANIT CHANINPORN

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MANIT CHANINPORN: DIARRHEAL ILLNESS AND HEALTH INFORMATION NEEDS OF INTERNATIONAL TOURISTS IN KOH LANTA DISTRICT, KRABI PROVINCE. THESIS ADVISORS: NOPPORN HOWTEERAKUL,Ph.D., NAWARAT SUWANNAPONG,Ph.D., CHAWEEWON BOONSHUYAR, M.S.PH. 78 p. ISBN 974-04-1539-3

Travelers' diarrhea (TD) has the potential to incapacitate travelers. Identifying the characteristics that affect travelers more prone to TD is needed to improve prevention and treatment of this illness. This analytical, cross–sectional study aimed to estimate the prevalence, determine the selected factors associated with diarrheal illness of international tourists and assess their health information needs. A total of 350 international tourists aged ≥ 15 years, traveling in Koh Lanta, were enrolled in this study. Data was collected through self-administered questionnaires from April 1st to May 30,th 2001.

One hundred and twenty seven (35.7%) of the international tourists had an occurren of diarrheal illness while traveling in Koh Lanta. Univariate analyses showed that factors associated with diarrheal illness were area of residence (OR = 4.62, 95% CI = 1.90-11.22 for America vs. Asia; OR = 2.38, 95% CI = 1.22–4.62 for Europe vs. Asia), journey type (OR = 5.46, 95% CI = 1.24-23.88) and duration of stay in Koh Lanta (OR = 4.91, 95% CI = 2.32-10.37; p for trend <0.001). Multiple logistic regression analysis indicated that, after adjusting for all other variables in the model, two variables were significantly associated with diarrheal illness. Significant predictors were duration of stay in Koh Lanta (adjusted OR = 5.7, 95% CI = 1.87-11.35; p for trend = 0.007) and attitude towards food and beverage selection and consumption (adjusted OR = 0.50, 95% CI = 0.30-0.83). Furthermore, 62.9% of the international tourists suggested providing adequate garbage bins and sewage systems; 59.1% need safety equipment in attractive destinations; and 54.9% suggested providing hospital staff with a good command of English. It was recommended that the organizations responsible for health and tourism should work hand in hand to solve the problems.

It is suggested that international tourists use ORS properly while then have diarrhea. Other suggestions include spot-checks of the cleanliness of food and beverage in hotels, restaurants and street vendors; Provide adequate garbage bins, sewage disposal systems and safety equipment at attractive destination; Provide attractive and concise information leaflets in English and other foreign languages.

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มานิจ ชนินพร: การเจ็บป่วยด้วยโรคอุจจาระร่วงและความต้องการด้านสุขอนามัยของนักท่องเที่ยวต่างชาติ อำเภอเกาะลันตา จังหวัดกระบี่ (DIARRHEAL ILLNESS AND HEALTH INFORMATION NEEDS OF INTERNATIONAL TOURISTS IN KOH LANTA DISTRICT, KRABI PROVINCE) คณะกรรมการควบคุมวิทยานิพนธ์: นพพร โหวธีระกุล, Ph.D, นวรัตน์ สุวรรณผ่อง, Ph.D, ฉวีวรรณ บุญสุยา, M.S.PH. 78 หน้า. ISBN 974-04-1539-3

โรคอุจจาระร่วงมีผลกระทบต่อความสามารถในการปฏิบัติภาระกิจของนักท่องเที่ยว การทราบถึงปัจจัยเสี่ยงที่ทำให้เกิดโรคนี้ในนักท่องเที่ยวจะเป็นประโยชน์ในการป้องกันและการรักษา การศึกษาแบบภาคตัดขวางเชิงวิเคราะห์นี้ มีวัตถุประสงค์เพื่อหาอัตราชุกและปัจจัยที่สัมพันธ์กับการเกิดโรคอุจจาระของนักท่องเที่ยวต่างชาติ เก็บข้อมูลโดยใช้แบบสอบถามกับนักท่องเที่ยวต่างชาติอายุตั้งแต่ 15 ปีขึ้นไปที่ใช้ภาษาอังกฤษในการสื่อสาร และพักที่อำเภอเกาะลันตา จังหวัดกระบี่ อย่างน้อย 4 วัน ระหว่างวันที่ 1 เมษายน ถึง 30 พฤษภาคม พ.ศ. 2544 จำนวน 350 คน

ผลการศึกษาพบว่า มีนักท่องเที่ยวต่างชาติ 127 คน หรือ ร้อยละ 35.7 ป่วยด้วยโรคอุจจาระร่วงในระหว่างท่องเที่ยวที่อำเภอเกาะลันตา การวิเคราะห์หาความสัมพันธ์ของตัวแปรเดี่ยวพบว่า ปัจจัยที่มีความสัมพันธ์กับการป่วยด้วยโรคอุจจาระร่วงในนักท่องเที่ยวคือ ถิ่นที่อยู่ของนักท่องเที่ยว (OR = 4.62, 95% CI = 1.90-11.22 เมื่อเทียบอเมริกากับเอเชีย; OR = 2.38, 95% CI = 1.22 – 4.62 เมื่อเทียบยุโรปกับเอเชีย), ลักษณะการเดินทางของนักท่องเที่ยว (OR = 5.46, 95% CI = 1.24-23.88), และระยะเวลาที่พักอาศัยอยู่ที่เกาะลันตา (OR = 4.91, 95% CI = 2.32-10.37; p for trend <0.001) ผลการวิเคราะห์โดยใช้สถิติถดถอยพหุลอจิสติก โดยควบคุมตัวแปรอื่น ๆ ที่ใช้ในการศึกษานี้ พบว่าตัวแปรที่มีผลต่อการป่วยด้วยอุจจาระร่วงในนักท่องเที่ยวคือ ระยะเวลาที่พักอาศัยอยู่ในเกาะลันตา (adjusted OR = 5.7, 95% CI = 1.87-11.35; p for trend = 0.007) ทัศนคติในการเลือกซื้อและบริโภคอาหารและเครื่องดื่ม (adjusted OR = 0.50, 95% CI = 0.30-0.83) นอกจากนี้ยังพบว่า ร้อยละ 62.9 ของนักท่องเที่ยวต่างชาติแนะนำให้จัดหาถังขยะเพียงพอและมีการกำจัดขยะในแหล่งท่องเที่ยว ร้อยละ 59.1 ต้องการอุปกรณ์เกี่ยวกับความปลอดภัย เช่น เสื้อชูชีพ ร้อยละ 54.9 ต้องการให้เจ้าหน้าที่ในโรงพยาบาลสามารถสื่อสารด้วยภาษาอังกฤษ หรือภาษาต่างประเทศอื่นๆได้ดี

ข้อเสนอแนะจากการศึกษานี้คือ หน่วยงานทั้งทางด้านสาธารณสุขและที่เกี่ยวข้องกับการท่องเที่ยวควรทำงานร่วมกัน โดยแนะนำให้นักท่องเที่ยวดื่มผงน้ำตาลเกลือแร่ขณะที่ป่วย ตรวจและปรับปรุงความสะอาดของร้านอาหารในโรงแรม ภัตตาคาร หรือหาบเร่แผงลอยเป็นประจำ จัดให้มีถังขยะเพียงพอและมีการกำจัดขยะที่ถูกต้อง สม่ำเสมอ ตลอดจนดูแลความปลอดภัยในระหว่างการท่องเที่ยว โดยจัดเตรียมข้อมูลเป็นภาษาอังกฤษหรือภาษาต่างประเทศอื่นๆ ที่มีนักท่องเที่ยวจากประเทศนั้นมาก

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CHAPTER I

INTRODUCTION

1.1 Rationale and justification

International tourism has been quickly become one of the most important economic industries in the world. The World Tourist Organization (WTO) has predicted that the number of people who go abroad on business or for pleasure increases every year (1). In 1992, The WTO reported that about 420 million international tourists traveling outside of their own country and international tourism receipts were estimated to be U$ 278,000 million annually (2). International Airline Travel Association (IATA) estimated that there was an increase of 20 million (43%) more international schedule air passengers by the year 2000 (1). Not only increasing in the amount of international tourists, but also changing in age, journey type of international tourists. That is, the increasing number of younger tourists.

At present, to plan a trip takes less preparation time, and money. Traveling is more convenient, personalized, flexible and exciting and within the reach of the younger populations. Technical innovations, dismantling of travel controls, and creative marketing in tour business have brought more people from even further distances with recreational or business motives. Tourists have only the bare basics; air plane tickets and hotel accommodation. They are solely responsible for their actions and well-being for the entire trip. Rising personal incomes, simpler and cheaper cost

of international travel and increased leisure-time have made a long distance travel available to increasing number of people (3).

Traveling has not effect only economic consequence, but also a number of social, culture, and medical consequences including risk of acquisition of a number of infectious diseases, including diarrhea. People engaging in international travel are from an epidemiological point of view, "a high risk" group for number of diseases and health hazards (3). By the nature of travel itself, no dangerous but behavior of tourists during travel outside own country had made tourists meet hazard (4). A number of factors contribute to risk to health. These include environmental, physical, situational risk and cultural contrast between their country. The destination was also factors associated with health in tourists. Environmental factors include changes of climate, altitude, food and water quality, hygienic standards and previously unknown health hazards. Physical factors in the new country include non-immunity against prevailing disease (5).

Tourists who go abroad often behave different than stay at home. Many tourists feel released from the routine stress of life and work. This may be risk factor for tourists willingness to experiment and to take certain risks. They would not normally take or be allowed to do in their home environment. The distinctly different lifestyle of the local population, the prevailing habits and customs, the unknown food and drink (excessive alcoholic), the new opening for adventures and all encourage the individual tourist to adapt and take a new true of his or her usual behavior. All of factors on constitute the basis for tourists to be considered a new group facing special health risks (4-5).

The most common health problem affecting tourism and predominant travel related illness among tourists is diarrhea. The incident rates varying widely from 20% to 100% depending on the country visited (6-7). Especially countries in tropics or subtropics or developing countries that impure water supplies and inadequate sewage disposal system (8). Steffen (9) found that there are three general geographic zones of risk have been identified. The highest risk areas are the developing countries such as Africa, Asia and Latin America; the incidence of diarrhea is ranged from 20% to 50%. Intermediate risk areas where incidence is ranged from 8% to 20% include Southern European countries. Low risk areas, where the incidence is below 8%, include Canada, the United States and Australia.

Diarrhea usually begins within 2 to 3 days of arrival in an endemic area, and greater than 90% of cases occur within the first 2 weeks or may occur at any time during travel and even after return home (10-13). There are many causes of diarrhea; these may be different for area and season variation. Causes of diarrhea can be grouped into two categories: diarrhea caused by an infection may result from bacteria, parasite, viral and diarrhea not caused by an infection. In many studied found bacteria pathogens are the majority (50%-80%) of diarrhea episodes and approximately 10% to 20% of the diarrhea episodes have no pathogens can be identified as a cause.

No data have been presented to support noninfectious cause of diarrhea such as spicy food, changes in diet, jet lag, altitude, and fatigue (14-16). When tourists were illness with diarrhea, symptoms may different from mild to severe such as 1-2 loose stool per day or cramp. Because diarrhea transmission by food beverage. Prevention to decrease risk factors by reduce risk behaviors of selection and

consumption food and beverage and practice follow information that given each area (17-18).

The health of tourists, especially in the countries where relying heavily on tourist income may have a significant impact on the economic. Although rarely a severe health hazard may be the cause of an economic deprivation to a community of it discourages export products such as food, fruits or tourism industry (including hotels and restaurants) (4,19). Several studies reported more people are traveling for recreational activities and business, and Asia and Africa are the fastest growing tourist destinations. These areas associated with a high incidence of travel related disease (19-23).

Thailand is one country that attracted international tourists to visit. The annual report of Travel Authority of Thailand (TAT) in 1998–2000 showed the number of international tourists increased each year, to be 7,221,345, 7,764,930, and 8,580,332, respectively (24-26). From 1982 to present time, the national income from tourism industry was ranked first as compared with other exported product (27). It has been said that the health of tourists cannot be separated from the economic consequence of failure. Therefore, it is essential to understand disease in tourists so that appropriate preventive measures can be taken. However, the mount of illness related to international travel has been difficult to establish because of their nomadic lifestyle and lack of international tourists' morbidity statistics (19) .

In addition to health information needs of tourist, the Health Ministry of Hong Kong sent a letter to Public Health Ministry of Thailand to inform that if tourists from Hong Kong visit Thailand what things that they should be taken care of during

traveling in Thailand such as restaurant shows its standard restaurant sign "clean food good taste" or drinking water with logo of Food and Drug Administration (FDA) (27).

Currently, there is a few study about diarrhea in tourists especially no study concerning diarrhea in international tourists in the southern part of Thailand. Therefore, this study examined the prevalence rate of diarrhea and assessing health needs of international tourists in Koh Lanta District. To reflect the real situation and problems for preventive measures and respond health information needs of international tourists, and to help promote tourism of Thailand.

1.2 Objectives of the study

1. To estimate the prevalence of diarrheal illness of international tourists in Koh Lanta District.

2. To assess health information needs of international tourists in Koh Lanta District.

3. To describe general characteristics of international tourists i.e. sex, age, country of residence, journey type, travel experience, received advice before departure.

4. To describe attitude towards food and beverage selection, and consumption of international tourists during traveling in Koh Lanta District.

5. To describe food and beverage selection and consumption behavior of international tourists during traveling in Koh Lanta District.

6. To determine the association between general characteristics, attitude towards food and beverage selection and consumption, food and beverage selection and consumption behavior of international tourists and diarrhea illness in Koh Lanta.

1.3 Hypotheses

1. There is an association between general characteristics of international tourists i.e. sex, age, area of residence, journey type, duration of stay in Koh Lanta, travel experience, received advice before departure and travel directly to Koh Lanta and diarrheal illness.

2. There is an association between attitude towards food and beverage selection with diarrheal illness in Koh Lanta.

3. There is an association between food and beverage selection and consumption behavior of international tourists and diarrheal illness in Koh Lanta.

1.4 Limitation of the study

The limitation of the study was the number of questionnaire pages. It is limit only 4 pages in order to reduce boring to tourists. Apart from that, as data collection method is self-administered although some of the international tourists can speak English but the proficiency in reading and understanding should be remarked. Therefore, for increase the efficiency of this questionnaire it should be shorter.

1.5 Definitions of terms

Travelers' diarrhea refers to diarrhea in person traveling outside of their own country with the passage of three or more loose stool in 24–hour period or one watery stool, or one mucus bloody stool in associated with one or more symptom of weakness, abdominal pain, vomiting, nausea, fever, or cramp.

International tourist refers to a person aged 15 years or more who has resident out of Thailand and come to Koh Lanta for traveling only, not for business or expatriate with staying in Koh Lanta at least 4 days and proficiency in speaking and writing in English.

Attitude towards food and beverage selection and consumption refers to the attitude of selection and consumption food and beverage of international tourists during traveling in Koh Lanta towards choosing a restaurant.

Behavior of selection and consumption food and beverage refers to behavior of selection and consumption food and beverage of international tourists during traveling in Koh Lanta in the aspects of hand washing, choosing a restaurant, eating raw vegetable or salad or raw seafood, trying some local food that never tasted before, and choosing beverage or drinking water.

Health information needs refers to health information need of international tourist in relation to health facilities, health care providers, and others.

Insurance in this trip refers to insurance of particular trip only, not include life or health insurance that tourists may have already in their countries.

Duration of stay in Koh Lanta refers to period since the tourists arrived in Koh Lanta until the day that researcher collected data or filling up the questionnaire.

1.6 Conceptual framework

Figure 1 shows the factors from the literature, which appear to affect diarrhea among traveler. General characteristics of international tourist such as sex, age, area of residence, duration of stay in Koh Lanta, journey type, travel experience, and received advise before departure. Attitude toward food and beverage selection and

consumption during traveling such as choosing a restaurant, consumption of raw vegetable or fresh fruit, consumption of drinking water or ice cube, tasted some local food, and consumption raw food or seafood. Behavior of selection and consumption such as hands washing before having meal or after use a toilet, choosing a restaurant, eating raw vegetable or salad or raw seafood, tasted some local food that never tasted before, and choosing beverage or drinking water. These factors are assumed to affect diarrheal illness of international tourists and lead to health information needs of international tourists.

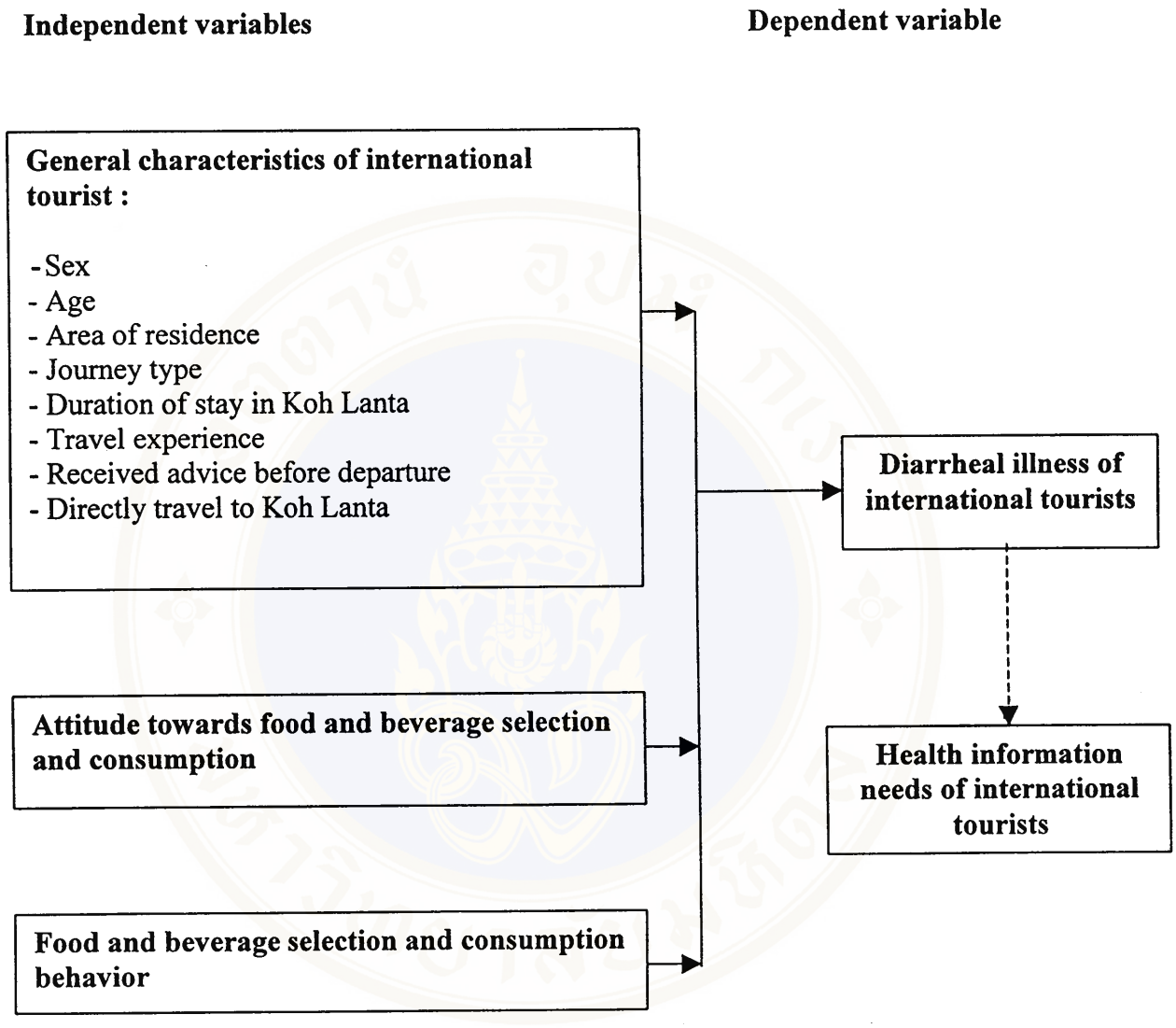

Figure 1 Conceptual framework of factors affecting diarrheal illness in international tourists

CHAPTER II

LITERATURE REVIEW

This chapter reviews the literature covering diarrhea, epidemiology, cause of diarrheal illness, prevention and treatment, attitude towards food and beverages selection and consumption, food and beverages selection and consumption behavior, conceptual of health, need, and health information needs of international tourists and relevant research findings.

2.1 Diarrhea

The world health organization (WHO) defined diarrheal illness as three or more loose stools of watered consistency or with one bloody or mucous in 24 hours period. However, for exclusively breast-feeding infant. A diarrheal episode is conventionally defined as beginning with the first 24 hour period that meet the definition of diarrhea and ending with the last diarrhea day that is followed by at least two consecutive days which do not meet the definition of diarrhea. Diarrhea cannot have longer than two weeks or it becomes, by the definition, we refer to chronic diarrhea, which is a separate clinical entity (28).

2.1.1 Epidemiology of diarrhea

Diarrhea occur worldwide and varies with the population and the region visited (11). The dominant risk factors for diarrhea including personal (younger age, socio-economic status), behavior (personal hygiene, food and water consumption) and environment (season variation, lived high risk area). Males and females are affected equally (6,11).

2.1.2 Etiology and mode of transmission

The causative agents of diarrhea varies in different part of the world. Many pathogens such as bacteria, viruses, and parasites are caused of diarrhea. The causative agents of diarrhea are transmitted by fecal-oral route. The ingestion of these agents can be either through eating contaminated food or drinking contaminated water or eating with contaminated hand (12,18). Further, files may be important vectors of enteric pathogens. Flies are able to carry pathogens from rubbish and sewage disposal areas to food preparation and display areas. There should be effective fly control in all food handling areas (14).

2.1.3 Prevention of diarrhea

The fundamental prevention strategy must be an improvement in drinking water supplies, safe sewage collection and disposal, and the achievement of levels of hygiene at all stages of the food chain (29). Food hygiene is necessary at all stages from the farm or field to the hotel or the restaurant kitchen. All food handling areas should be free from insects and rodents. Neither differentiates between uncooked

food, sewage and prepared food. Even if they do not contaminate food directly they may transfer enteropathogens to food preparation surface (30).

2.1.4 Treatment of diarrhea

The mainstay in treatment diarrhea is maintaining an adequate fluid intake to compensate for fluid and electrolytes lost owing to diarrhea. Oral Rehydration Solution (ORS) is probably one of the most importance. In terms of a cost–effective, simple but elegant intervention to save countless lives otherwise lost to dehydrating diarrhea (11). In many countries, appropriately formulated glucose–electrolyte solutions are now available in pharmacies and grocery stores. Flavored mineral water contains glucose and hypotonic salt solution and can be used for rehydration in mild to moderate cases of diarrhea.

For more severe and distressing symptoms, or when results of a stool culture show the diarrhea is caused by an invasive pathogen such as *Shigella* species, *Salmonella* species (18). They might treat diarrhea with an antimicrobial agents plus antimotility gents (see Figure 2). Antimotility drugs such as Bismuth Subsalicylate (BBS), Loperamide can reduces the number of unform stools and is regarded as an effective empiric treatment in patient with diarrhea who have no evidence of high fever or dysentery.

In comparative studies indicated that Loperamide is more effective than BBS (31). Antimicrobial agents which have been show to shorten the illness (average of 59–93 hours to 16–30 hours) include Doxycycline, Trimethroprim-Sulphamethazole, Norfloxacin, and Ciprofloxacin. Antimicrobial are indicated if the patient is feverish or if the symptoms are more than an inconvenience. Prompt medical

attention should be sought in all cases if: diarrhea does not settle or becomes bloody and traveler becomes toxic or confused (31-33).

Guideline for therapy may follow the clinical severity of the illness

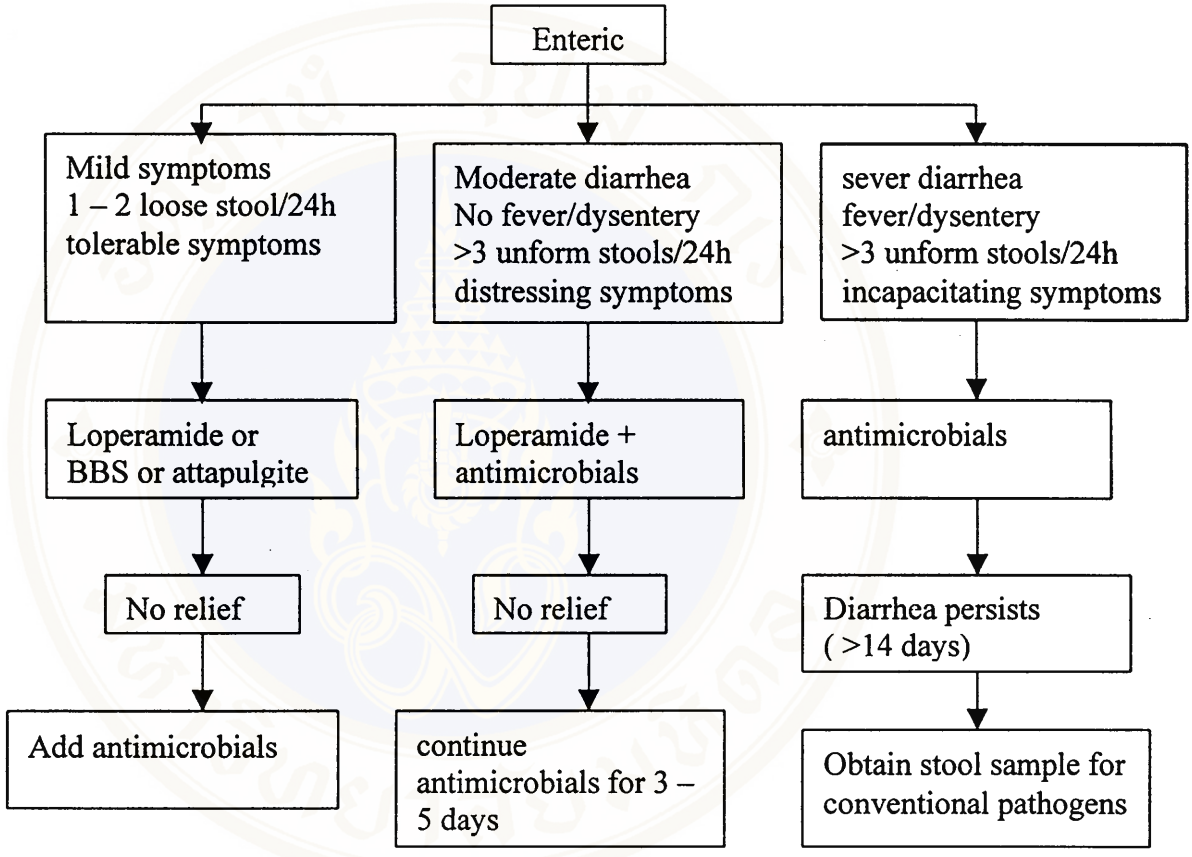

Figure 2 Suggested approach to the empirical treatment of diarrhea
Source : Caeiro and Dupont (7)

2.2 Travelers' diarrhea

Travelers'diarrhea was defined as diarrhea in persons traveling outside of their own country and passing of three or more unformed stool in a 24–hour period, or one watery stool or one bloody stool in association with at least one symptom of enteric disease such as nausea, vomiting, abdominal pain or cramps, fever or tenesmus

(6-9). Characteristically, the disease is manifested within the first two week after arrival in the destination average 3–4 days (13,20) and it may occur at any time during the trip and even after returning home (6).

2.2.1 Causes of travelers'diarrhea

There are many causes of travelers' diarrhea; these may be different for area and season variation. Causes of travelers'diarrhea can be grouped into two categories: travelers'diarrhea caused by pathogens and travelers'diarrhea caused by non-pathogens. Table 1 lists cause of travelers'diarrhea.

Travelers'diarrhea caused by pathogens may result from bacterial, parasites, and viruses. Several studies found different pathogens predominate in different regions. The principle agent was bacteria, the majority pathogens of travelers' diarrhea episode in at least 50% to 80% of cases (6,34-38). All cases of diarrhea in the first 1-2 weeks of travel are likely to be due to bacteria. However, bacteria diarrhea can be acquired at any point in one's travels, from the first day to the last.

Bacteria diarrhea is characterized by the sudden onset of relatively uncomfortable diarrhea. Bacteria diarrhea can also be associated with nausea, vomiting, fever or severe abdominal cramps. The bacterial pathogens recovered are as follow: Enterotoxiginic *Escherichia coli* (ETEC), *Shigella* species, *Campylobacter jejuni*, *Aeromonas* species, *Plesiomonas shigelloides*, *Salmonella* species and Non - *Cholera vibrio* depend on country visited. ETEC were the most commonly identified pathogens in all of the studied followed by *Salmonella*, *Shigella*, *Campylobacter*, and *Vibrio paraheamolyticus* (39-40). Taylor and Echeverria (41) found that *A. hydrophila*

and *P. shigelloides* were commonly isolated from travelers in Thailand but less frequently from other country. The disease caused by *Shigella* tends to be more severe than the usual form of traveles' diarrhea. Tauxe et al (32), show some cause *from Shigella spp.* associated with the hemolytic–uremic syndrome. Certain agents have been associated with epidemics of diarhea, *V. paraheamolyticus* may cause epidemic or even pandemic disease, as occurred out break in United Stated of America in 1997 (42). This associated with eating raw or poorly cooked seafood such as oysters.

Protozoal diarrhea is characterized by a more gradual onset of chronic diarrhea. An infected person wakes up with a few loose stool, goes out for the day without difficulty, has another loose stool or two later on, and wonders if something is wrong. Nausea, vomiting or fever are extremely rare. This pattern goes on for another few days or week before the person feels ill enough to seek care. Protozoal such as *Entamoeba histolytica*, *Giardia lamblia*, *Cryptosporidium* together account for less than 2% of infections in most part of the world. But may be an important cause of chronic diarrhea (39-40).

Viruses that are responsible for travelers'diarrhea in the tropics such as rotavirus and Norwalk virus are isolated in up to 20% of cases of diarrhea in traveler, but more common in children less than 2 years than adult. Diarrhea caused by viral agents it usually self–limited. A major clinical manifestation of viral enteritis is vomiting. Viral infections cannot be cured by antibiotics, and they go away by themselves within a few days.

In high risk diarrhea areas, it is possible to be infected with more than one organism at the same time. A stool exam can lead to a diagnosis if done in a reliable laboratory.

Table 1 Regional distribution of organisms causing travelers'diarrhea

Organisms	Africa[a] (%)	Asia[a] (%)	Latin America[a] (%)	Middle East[b] (%)
Bacteria				
ETEC	8 – 57	6 – 37	11 – 70	57
Shigella spp	0 – 9	0 – 19	2 – 30	4 – 20
Salmonella spp	4 – 25	1 – 33	1 – 30	2 – 7
Campylobacter jejuni	1 – 28	1 – 58	1 – 5	2
Aeromonas spp	0 – 9	1 – 57	1 – 5	NR
Plediomonas shigelloides	3 – 5	3 – 13	0 – 6	NR
Virus				
Rotavirus	0 – 36	0 – 8	0 – 6	6
Parasite				
Entamoeba histolytica	2 – 9	5 – 11	< 1	NR
Cryptosporidium spp	2	1 – 5	< 1	NR
Giardia lamblia	0 - 1	1 – 12	1 – 2	NR
Cyclospora spp	< 1	1 – 5	< 1	NR

Reference [a] Caeiro and DuPont (7), Ericsson (12) NR = not reported
[b] Hymas et al.(43)

Many cases of travelers' diarrhea have no organisms are identified as a cause in approximately 15%–50% of the patients with diarrhea. The reason remains unknown perhaps this may be explained by inadequate laboratory techniques or the fact that to this day not all pathogens have been recognized and from other causes such as jet lag, altitude, and fatigue (6,44). Further, some drug may be causing diarrhea such as Mephanamic acid (Ponstan), Indomethazine (Indocid), Methyldopa (Aldomed) (44).

Moreover, some pathogens, such as ETEC are not identified by routine stool culture. Identification of ETEC requires special techniques, such as polymeres chain reaction (PCR), immunoassays, DNA probes, cell culture, or animal assays. When routine laboratory tests fail to identity a pathogen and state or local health departments should be notified (45).

2.2.2 Syndrome

The syndrome of travelers'diarrhea covers a board clinical spectrum, ranging from short episodes mainly caused by ETEC and, to a lesser extent, Rotavirus, Norwalk virus and *Aeromonas* species, to more prolonged episodes caused by *Salmonella* species, *Shigella* species, and *C. jejuni* However, the illness is rarely severe in adults (18).

2.2.3 Risk factors for travelers' diarrhea

The high risk were adults travelers who had aged rang from 20 to 35 years. The lowest travelers'diarrhea are noted in travelers over 55 years of age (9,12). For this reason among the high risk, perhaps because of their limited previous travel experience or lack of acquired immunity or their travel style (more adventure) and different eating habits (10,14,22). Hill (47) reported that young tourists have significantly higher risk of travelers'diarrhea (p-value < 0.05).

The country origin of the traveler is another important factor in travelers' diarrhea liability. Travelers who originate from areas in which travelers' diarrhea is uncommon are at high risk for that ailment when they travel to areas in which it is common. Conversely, travelers who originate in areas where travelers' diarrhea is common are at low risk for acquiring it whether they journey to high or low risk areas (31). Peltola, Kyronsepp, and Holsa (22) found that in Finnish travelers, diarrheal occurred in 36% and 25% of persons visiting North Africa and Thailand, respectively.

The destination of tourist abroad is also investigated in relation to travelers'diarrhea. The world can roughly be divided into three zones based on the risk for travelers' diarrhea; high risk areas, where the incidence of travelers' diarrhea ranges from 20 to 50%, include African, Latin America, the Middle East, and most in Asia. Intermediate risk destinations with 10 to 20% incidence of travelers'diarrhea, include Southern European countries, Israel, and a few number of Caribbean islands. Low risk areas, where the incidence is below 10%, include Canada, the United States, Northern Europe, Australia, New Zealand, and a number of the Caribbean islands (9).

The incidence of travelers'diarrhea do not correlate with the season of travel but seasonal variation is a common phenomena of predominate pathogens infection in many localities. In the sub tropics countries viral diarrhea is predominant in winter and bacteria diarrhea in summer. In the tropical countries bacteria diarrhea predominant during summer and rainy season (40). This may be due to that the ground water can contaminate the water supply (18).

Sonnenberg et al (48) and Steffen (9) found that season has no influence with the incidence of diarrhea, in contrast Mattila et al (40) found thatin the warmer season (fall), the mean attack rate of travelers' diarrhea was 31%, higher than in the winter (15%; p–value < 0.001), similarly the results from Reide and Cossar (49) found the mean attack rate for winter was 20% compared with 31% for summer travelers.

Mattila et al (40) studied in Morocco found that *Campylobacter* strains were the leading cause of travelers'diarrhea in winter (28%) but only 7% in fall, whereas ETEC was the most common pathogen in fall (32% and 8% in winter). Both differences are highly significant (p–value< 0.001). *Salmonella* strain was almost

as common as ETEC in fall 25%, but rare in winter 10% (p–value = 0.05). Similarly, among US adults in Guadalajara, Mexico *Campylobacter* causes diarrhea predominantly in the winter season, and ETEC causes diarrhea in the summer, and rainy season (50).

In numerous studies, risk for travelers'diarrhea has been related to journey type (51). The adventure travelers seem to be at high risk for diarrheal episode when compared with group tour. Accordingly, tour operators use a standard hygiene checklist for hotels to improve standards of hygiene's tourists (52).

The attack rate of travelers' diarrhea varied with duration of stay. The long duration of time associated with reduced incidence rate. The duration of travelers' diarrhea is usually short, particularly in areas of low incidence (53). The onset of diarrhea is usually within the first week of travel, a peak rate on the third and fourth day but may occurred at any time during travel (54). The newly arrived traveler is at higher risk of travelers' diarrhea when compared to the expatriate living in the same area (14,37). Expatriates from developed countries who reside in developing countries like Nepal for prolong periods of time seem to decreased diarrheal episode (p-value<0.001) (15).

Ansdell (55) found that travelers' diarrhea usually begins within 2 to 3 days of arrival and greater than 90% of cases occurred within the first 2 weeks of stay in abroad. In the study of Gaudio et al (53) it was found the persons who stayed more than one year in abroad had significantly lower prevalence of diarrhea than persons who stayed shorter tenure (RR = 0.62, 95% CI 0.40 – 0.97).

In area where it could be evaluated, travelers staying in international standard (three or four stars) hotels had an attack rate equal to that of persons staying

in ordinary accommodation (56). As previously reported (51,55), four-and five-star hotels have been demonstrated not to have significantly lower attack rates than two-or three-star hotels.

Traveler's experienced had a lower rate of diarrhea than neophytes (56). Experienced tourists may eat and drink more carefully or they might have partial immunity by repeated exposure to pathogens as previously reported (57).

2.2.4 Prevention of travelers' diarrhea

General information

Prevention of travelers'diarrhea is the cornerstone of a safe, enjoyable trip or may safe a traveler's life. The strategies for prevention of travelers' diarrhea include providing education about ingestion of safe food and beverages and urged to follow various dietary recommendations (for example, boil it, cook it, peel it, or forget it) (9,11). Travelers should avoid eating from street vendors or eating salads or unpeeled fruits or avoid eating local food (57). Travelers should assume that water is not safe to drink unless they are specifically informed to the country by the health authorities in each country (58).

Food and water precautions

Tourists can prevent travelers'diarrhea if they can avoid eating or drinking water that is contaminating with stool. However, this is harder than it might seem in countries with a poor ability to dispose of stool safely. The basic idea is to treat all water as if it is potentially contaminated and to avoid foods that are likely to be contaminated (29).

2.2.5 Drug prophylaxis for travelers'diarrhea

Prophylaxis was found to be more cost–effective than treatment for many travelers when treatment was an antimicrobial agents. Kean (59) reported that antimicrobial agents were useful in prevention of travelers'diarrhea. Because the majority of causes of travelers'diarrhea were caused by bacterial enteropathogens.

Tourists should begin taking any drug used for prophylaxis such as Bismuth Subsalicylate (BBS) on their first day in the country they are visiting and should continue to take it for two to three days. But should not take it for more than 3 weeks if they remain in the country because of its cost, increased toxicity, and interference with the natural immunity that occurs with time. Antimotility agents, such as Loperamide (Imodium) and Diphenoxylate with Atropine (Lomotil), should not be used for prevention of travelers'diarrhea. Because constipation is a common side effect of these drugs. (54)

2.3 Attitude

The study of attitudes has a long and complex history in social psychology, most researchers seem to agree that an attitude is a state of readiness, a tendency to respond in a certain manner when confronted with certain stimuli. Most of an individual's attitudes usually dormant and are expressed in speech or behavior only when the object of the attitude is perceived. Attitudes are reinforced by beliefs (The cognitive component) and attract strong feelings (The emotional component) which may lead to particular behavioral intents (The action tendency component). Most attitudes are parts of a wider compound of values, beliefs and feelings and are themselves made up of several components or sub-areas (60).

Roedier et al. (61) defined an attitude as 'a relatively stable tendency to respond consistently to particular people, objects, or situations'.

Doob (62) defined an attitude as an implicit, drive producing response considered socially significant in the individual's society.

Katz (63) defined an attitude as the predisposition of the individual to evaluate some symbol or object or aspect of his world in a favorable or unfavorable manner.

To conclude, attitude is a state of readiness, a tendency to respond in a certain manner when faced with stimuli. Attitudes are parts of a wider compound of values, beliefs and feelings.

This study examined the attitude towards food and beverage selection and consumption of international tourists at Koh Lanta District.

2.4 Health behavior

Webster dictionary (64) defined behavior as 'manner of behaving whether good or bad mode of conducting one's self; conduct deportment carriage'

Health social scientist first conceptualized health behavior as an activity undertaken by an individual believing himself or herself to be healthy for purpose of preventing health problems (65). In 1993, Alongo (66) has identified four separate dimensions of health behavior. **1.) Prevention.** The gold of preventive health behavior is to minimize the risk of disease, injury, and disability. These "health-protective behaviors" include participating in regular exercise, maintaining a favorable weight and healthy diet, not smoking, and obtaining immunizations against communicable diseases. **2.) Detection**. Detection involves activities to detect disease, injury, or disability before symptoms appear and includes medical examinations (such as taking

the blood pressure) or screenings for specific diseases. **3.) Promotion**. Health promotion activities consist of efforts to encourage and persuade individuals to engage in health-promoting behaviors and to avoid or disengage health-harming behavior. 4.) **Protection.** Health protective activities occur at the societal rather than the individual level and include efforts to make the environment in which people live as healthy as possible. Doing this involves monitoring the physical and social environments in which people live; physical structures and infrastructures; systems of transportation; available food, air, and water; places of work; and developing social and economic policies that permit and encourage good health.

Individual preventive health behavior

Health protective Behaviors (HPBs) are individual actions taken to protect, promote, or maintain health. These actions are both prescriptive in nature e.g., eat a nutritious diet, fasten a seat belt when in a car, get adequate exercise and proscriptive e.g., avoid unsafe driving, smoking, and excessive alcohol consumption (67).

In this study focused on international tourists preventive behavior on the aspect of food and beverage selection and consumption behavior.

2.5 Concept of health, needs, and health information needs assessment

Health information needs of international tourist and health are two closely linked concepts. Both are directly related and very important to national economy. In this study we present some reflections on health information needs of international tourist.

Health : There are many definitions of health, but the most often used was The World Health Organization (WHO) 's definition. Health was defined as "a state of complete physical, psychological, and social wellbeing and not simply the absence of disease or infirmity"(68).

Needs : Health professionals, philosophers, sociologists and economists have different views of needs.

Bradshaw (69) defined needs as :

1.) Felt needs (want) refers to individual perceptions of variation from normal health such as wants, wishes, and desires; 2.) Expressed needs (demand) refers to individual seek help to overcome variation from normal health. For example asking for pain relief, striking for more pay; 3.) Normative (real needs) refers to professionals defines interventions appropriate for the expressed need; 4.) Comparative need (inequality) refers to comparison between needs for severity, size, and range of interventions, cost.

In this study, health needs refers to health information needs of international tourist focused on need for health care, health facilities and health care providers rather than a more general need for health.

2.5.1 Pre–travel health information or advice

The primary objective of advice before travel is to prevent health problems before they occur. Traveler who will be traveling to developing countries should be taken pre–travel advice about risk factors for travelers' diarrhea and provided information about hygienic practices, food and water precautions, and protection against insect–born disease. Pre–travel advice can reduce the need for

medical assistance while abroad (70-71). Many travelers request up to date information on recent outbreaks of infectious disease. This demand has led to the creation of a number of data bases, which provide information on worldwide outbreaks of disease. Approximately 840,000 or more travelers need pre-travel health advice each year (72).

The quality of health information and advice varies between each source. Travel agencies and tour operators have a notoriously poor reputation for being health information sources and this include embassies and government tourist office (56). The information given is oftenly unreliable or out of date. Travel agencies, especially those, who are young and inexperience, often seem incapable of seeing beyond the commission on their next sale. In their defense, travel agencies usually say that they are not doctors, and it is not their job to provide medical information.

The sources from media articles such as travel guidebooks are the most significant information channel, in numerical terms. These sources are often extremely useful, the information generally originates from lay sources, and major inaccuracies are frequently passed on as fact. Many books are available to provide health information for travelers; they have been written by doctors, nurses, journalists and travelers. They range from health tips and lists of do's and don'ts, to more detailed advice and health education, and even presumptive treatment. Each has devotees and its strong points and failure which the most appropriate choice is essentially a matter of personal preference. While general principles of prevention do not change dramatically over time, some of the material that is published is inevitable time-sensitive and requires a commitment to maintenance and updating (56).

The source from online electronic data base service is provided for subscribers; however, travelers can apply in writing for a printout of health information tailored to their particular travel plans. These data bases are able to provide information on recent problems including disease outbreaks and changes in prophylaxis advice in tropical countries, which are relevant to the health of travelers and are accessible through a computer terminal.

2.5.2 Information content

General principles, food hygiene and water safety, and illness and medical treatment abroad should be provided. It is important for travelers to realize that in most cases, each disease of concern does not have its own, unique, specific preventive measure. Prevention follows logical principles that relate directly to how diseases are spread, and most preventive measures are common to much disease.

In formation concerning selection food and beverages, in general, contaminate food is a much more common cause of travelers' diarrhea than contaminate water or other beverage (68). Therefore, the location where meals are taken by travelers is important. It can be a risk for travelers' diarrhea but choosing safe places to eat in developing countries is difficult. Even in a restaurant that has a clean certified may have substandard practices in the kitchen. Food sold by street vendors is a notorious and repeatedly documented source of risk. Risky food includes uncooked vegetables, rare meat, and seafood. Cooked foods are safe as long as the temperature at the interior of the food has reached 160 °F (65 °C) or more (70).

Uncooked vegetables such as salads are notorious vehicle for travelers' diarrhea. It has been stored at inadequate temperature or cook at insufficient temperatures is being the main source of enteric pathogens. Food should be well

cooked and should be hot when served. Even if the food is not intrinsically contaminated, either cross–contamination in the kitchen or contamination with pathogens of human origin such as ETEC or *shigella* may occur via the hands of food preparer.

Rare meats are often considered a delicacy, travelers should be considered particularly hazards in developing countries. Some pathogens such as *Trichinella spiralis*, *Salmonella*, and *Campylobacter*, may be intrinsic contaminants of meats in these areas. Some seafood such as bivalve mollusce or crustacea or oyster seem to have a particular appeal to travelers, despite the intrinsic hazards. Travelers must be avoided because of the high risk of fecal contamination of the beds from which they are harvested (70). Eating in luxury hotels may not be any safer than eating in standard hotels. The highest risk of diarrhea is associated with eating food purchased from street vendors (51,55-56).

Drinking water and other beverages in developing countries, no commercially obtained water source may be considered absolutely safe. Travelers should assume that tab water is not safe to drink unless they are specifically informed to the contrary by health authorities in each country (57-58). Tea or coffee that is made with boiling water can be considered safe if it is consumed while it is still hot, but ice coffee or tea are not safe. In addition, water treatment is an essential component in the prevention strategy of diarrhea illness it must be boiled for up to 10 minutes to render it safe to drink. Water hotter than 70°C is adequate to kill all the organism that cause of diarrhea (71). Bottle beverages, including beer wine and carbonated beverages, are generally safe for consumption until the seal is damaged or carbonate is lost, or nonflavored beverages (30).

Ice is another potential source of travelers'diarrhea. Ice made from untreated water is unsafe because of freezing water to make ice cube has a similar effect (freezing water to form ice does not kill pathogens); therefore, ice should be avoided as assiduously as tab water (30).

Advice about washing hand almost always needs further explanation: it is necessary to wash hand before a meal or after use toilet. But many travelers then proceed to wipe their hands on a towel that has been contaminated by others, touch the bathroom door handle, and then return to handle their food. Contaminated water for washing hand can transmist of pathogens from the hands of food preparers to food (68).

Insurance during travel, international medical insurance is short or long-term medical insurance designed to reimburse for medical expenses incurred when traveling or living in destination. Maximum policy coverage levels can be substantial enough to cover major medical expenses such as emergency, surgery, and extended hospital stays. Travelers should be advised to obtain adequate health insurance coverage for travel and to consider medical evacuation coverage (52).

2.5.3 Other health service

Telephone hotlines are providing health advice service on a variety of topics relevant to specific destinations controlled by a touch–tone phone. In addition to computerised health information databases. From studied of Leman and Williams (73) indicated that of 24 hours emergency health care provision and needs for interpreter in accident and emergency (A&E) departments across United Kingdom were required.

CHAPTER III

MATERIALS AND METHODS

This chapter firstly describes the research methodology employed in the study. Secondly, study area, study population, and sample size calculation are presented. Thirdly, description research instruments and its validity and reliability and fourthly, demonstrates data collection process, scoring criteria and data analysis are presented. Following this, ethical considerations in this study are also explained.

3.1 Research design

This study is an analytical cross–sectional study to determine the prevalence of diarrhea and to assess health needs of international tourists.

3.2 Study area

Koh Lanta is one of the most famous island destinations in Krabi, a province in the southern part of Thailand. It has been a well-known sight-seeing place that attracted international tourists. In the year 2000, the number of tourists visited this island was approximately 4,000 –5,000 persons (26). In addition, it is the responsible area of the Koh Lanta District Health Office where the researcher work in taking care of international tourists and local people health.

3.3 Study population

Study population were international tourists who traveled in Koh Lanta from April 1, to May 30, 2001. Traveling by both, self–arrangement and tour operation.

Inclusion criteria

The inclusion criteria consisted of:

1. International tourists aged 15 years or more.
2. Proficiency in speaking and writing English.
3. Stay in Koh Lanta for at least 4 days before filling up the questionnaire.

Exclusion criteria

The exclusion criteria consisted of:

1. International tourists who were unwilling to participate in this study.
2. International tourists who expatriate residents in Thailand.

3.4 Sample size

The estimated sample size was calculated from the following formula.

$$n = \frac{Z^2_{1-\alpha/2}\, p(1-p)}{d^2}$$

where, n = Estimate sample size

$Z_{1-\alpha/2}$ = The value from normal distribution associated with 95 % confidence level = 1.96

α = Level of statistical significance was set at 0.05

p = Proportion of tourist who got sick by diarrhea in Krabi province, the value was determined from Krabi hospital in 1999 = 0.16 (71)

d = Absolute precision required on either side of the proportion of the study, the value of 4% was selected.

$$n = \frac{(1.96)^2 \times 0.16 \times (0.84)}{(0.04)^2} = 322.69$$

$$= 323$$

The minimum sample size needed was 323, but in this study a total of 350 international tourists were enrolled.

3.5 Research instruments

The research instruments were self–administered questionnaire that approved by all thesis committee.

Structured questionnaire was used for collecting data from the tourists. It consists of four parts. (see Appendix A):

Part 1 General characteristics of international tourists

The first section of the questionnaire consists of seventeen close-ended with multiple choices. Questions concerned about general characteristics of international tourists i.e. sex, age, country of residence, marital status, education level, occupation, journey style, experience of traveling destination, experience of traveling in Thailand, an information received, accommodation, length of time spent in Thailand, purchase of health insurance, illness and treatment for this trip, and suspected place of getting diarrhea.

Part 2 Attitude towards food and beverage selection and consumption

The second part contains ten close-ended questions concerned with attitude towards selection and consumption during travel in Koh Lanta. The attitude included, choosing a restaurant, consumption of beverage or ice cube, fresh fruit or vegetable or raw seafood, and tasting local food.

Part 3 Selection and consumption behavior of food and beverage

There are ten close-ended questions regarding the international tourist behavioral factors which included hand washing before eating and after using toilet, selection drinking water, consumption of fruit and vegetable, and try food that never taste before.

Part 4 Health information needs

There are twelve close-ended questions to assess health needs while travel in Koh Lanta District.

3.6 Validity and reliability

The constructed questionnaire was cheaked for content validity by the committee and pre–tested with thirty international tourists at Pattaya beach, Chonburi. Cronbach' s Alpha Coefficient was used to assess the reliability of the questionnaire. After completing the first pre-test, the questionnaire was analyzed. The Cronbach' s Alpha Coefficient of attitude towards food and beverage selection and consumption scale was 0.6. Selection and consumption of food and beverage behavior scale was 0.48 and health informational needs was 0.71. As a result, two scales questionnaire were needed to improve. Some items were revised and some were deleted. Then, the

questionnaire was pre–tested again with other international tourists at the same place. For the second pre-test, the Cronbach' s Alpha Coefficient of both scale were 0.7 and 0.8 respectively.

3.7 Data collection , scoring criteria and data analysis

Data collection

The study period was from April 1, to May 31, 2001. Two research assistants were the public health officers at Koh Lanta district. Data collection procedures were as follows:

1. Before beginning data collection, two local public health personnel of Koh Lanta District were trained regarding objectives of the study, contents of questionnaire, how to interview and collecting data. Then, they were assigned to collect data in each study area. Both of them wear casual dress during data collection to reduce interviewer bias.

2. Asking permission from the owners or managers of bungalow, guesthouse, and hotel for data collection.

3. All interviewers introduced themselves and explained the objectives of the study to an international tourist. Then, give the questionnaire to international tourist to complete by himself or herself. If the international tourists were unclear or did not understand any item, then the interviewer gave explanation to them.

4. Check the completion of each questionnaire.

5. Incomplete questionnaires were excluded and replace with a new one until it reached 350 cases of international tourists.

Scoring criteria

The attitude, behavior and health information needs scale were scored as the following:

1). Attitude towards food and beverage selection and consumption: Each item was rated on a 3 point-rating scale. The positive items were scored ranging from 1 = disagree, 2 = uncertain, to 3 = agree. A reverse score was assigned for negative items from 1 = agree to 3 = disagree (Question 10). The score from 10 items were totaled. The total score ranged from 10 to 30. Then, the scores were classified into two levels; a score of less than 80 % of total score was negative attitude, and a score of at least 80% of total score was positive attitude.

2). Food and beverage selection and consumption behavior: Each item was rated on a 4 point-rating scale. The positive items were scored ranging from 0 = never, 1 = sometimes, 2 = often, to 3 = always. A reverse score was assigned for negative items from 0 = always to 3 = never, (Question 9). The score from 10 items were totaled. The total score ranged from 0 to 30. Then, the scores were classified into two levels; a score of less than 80% of total score was need improvement behavior, while a score of at least 80% of total score was good behavior.

3). Health information needs of international tourists: Each item was rated on a 3 point-rating scale. The score ranged from 1 = low need, 2 = moderate need, to 3 = high need. The score from 12 items were totaled. The total score ranged from 12 to 36. Then, the scores were classified into two levels: a score of less than 80% of total

was low health information needs, while a score of at least 80% of total score was high health information needs.

All possible scores and cut-off points of each variable were shown in Table 3.

Table 3 Possible scores and cut-off points

Variable	Possible score	Cut off-points	
		Positive/ Good	Negative/ Need improvement
Attitude	10–30	24–30	10–23
Behavior	0–30	24–30	0–23

Data analysis

The completed questionnaires were coded and analyzed. Both descriptive and analytical statistics were used for data analysis.

1. Descriptive statistics such as percentage, mean, median, standard deviation (SD) were used to describe the details of all studied variables.

2. Analytical statistics

Logistic regression analysis was used to obtain crude odd ratios (ORs) and 95% confidence intervals to determine the association between sex, age, duration of stay, country of residence, journey type, received pre–travel advice, attitude towards food and behavior of food and beverages selection and consumption, and diarrheal illness. Unconditional multiple logistic regression analysis was used to control potential confounders. The level of significance was set at $= 0.05$.

3.8 Ethical considerations

Permission to conduct this study was gained from Head of Koh Lanta District Health Office. Verbal consent was obtained from each international tourists. The

collected data was used by only for the purpose of this study. No permanent record of study subjects name or other identifying information had been made. All the information obtained from this study was treated as confidential. The reports of this study did not identify name of all studied subjects.

CHAPTER IV

RESULTS

The results are described in the following topics: general characteristics, attitude towards food and beverage selection and consumption, behavior of food and beverage selection and consumption, and health information needs of international tourists. The associations between those factors and diarrheal illness were shown in the last part.

4.1 General characteristics of international tourists

Table 3 shows that 43.1% were female. The age ranged from 17 to 76 years with the mean of age was 32.6 years. More than half (58.3%) were single. Approximately 65% of the respondents came from Europe, mainly from the United Kingdom.

About 43% of international tourists completed bachelor degree or higher and 6.3% of them completed other professional training such as year-course, hair-dressing, cooking. Approximately half of respondents (50.6%) was employee. Almost the entire tourists (94.3%) traveled by self–arrangement. About 81.4% had insurance in this trip. Approximately 77.7% stayed in bungalow and only one person (0.3%) stayed in own camp. The shortest duration of stay in Koh Lanta was 4 days with the median 20 days. The majority of the respondents (88.6%) had experiences for traveling abroad. More than half of the respondents (56.0%) had never visited Thailand before. Only 18.6% of the international tourists came directly to Koh Lanta. Most of them (72.1%) visited other places in Thailand before arriving Koh Lanta.

Table 3 General characteristics of international tourists (n = 350)

General Characteristic	Number	Percent
Sex		
Male	199	56.9
Female	151	43.1
Age (years)		
17 - 29	154	44.0
30 - 44	150	42.9
45 and over	46	13.1
Mean= 32.6 SD = 10.3 min = 17 max = 76		
Marital status		
Single	204	58.3
Married	97	27.7
Widow / divorced / separate	19	5.4
Others	30	8.6
Area of Residence		
Europe	228	65.1
Asia	64	18.3
America	37	10.6
Australia	21	6.0
Education level		
Primary school	17	4.8
High school	107	30.6
Diploma	52	14.9
Bachelor degree or higher	152	43.4
Others	22	6.3
Occupation		
Employee	177	50.6
Unemployed / student	77	22.0
Self–employed	61	17.4
Civil-servant	23	6.6
Retired	12	3.4
Journey type		
Self–arrangement	330	94.3
Group tour	20	5.7
Insurance in this trip		
Yes	285	81.4
No	65	18.6
Accommodation		
Bungalow	272	77.7
Hotel	58	16.6
Friend's house	11	3.1
Guesthouse	8	2.3
Camping	1	0.3

Table 3 General characteristics of international tourists (continued)

General characteristic	Number	Percent
Duration of stay in Koh Lanta (days)		
4 – 7	72	20.6
8– 14	60	17.1
15 – 30	141	40.3
31 and over	77	22.0
median = 20 min = 4 max = 330		
Experience for traveling abroad		
Yes	310	88.6
No	40	11.4
Frequency of visit Thailand (times)		
Never	196	56.0
1 – 2	92	26.3
3 – 4	24	6.9
5 and over	38	10.9
mean = 1.7 min = 0 max = 20		
Travel directly to Koh Lanta		
Yes	65	18.6
No	285	81.4
Visited other place before Koh Lanta [a]		
Other country	112	32.0
Other place in Thailand	270	72.1

[a] multiple responses

4.2 Illness while traveling in Koh Lanta

Table 4 shows the prevalence of illness of the international tourists during this trip. The common signs and symptoms of illness were headache 36.6%, followed by diarrhea 35.7%, stomachache 34.6%. Only 6.3% of the international tourists had other symptoms such as ear infection, sun burn, and muscle pain.

Table 4 Prevalence of illness of international tourists during this trip (n = 350)

Illness	Number	Percent
Sign and symptoms [a]		
Headache	128	36.6
Diarrhea	127	35.7
Stomachache	121	34.6
Itchy	94	26.9
Nausea / vomiting	71	20.6
Flu-like syndromes	67	19.1
Fever	65	18.6
Others	22	6.3

[a] multiple responses

Of 127 cases of the traveler who experienced diarrhea during this trip. Most of them (76.4%) had 3 or more loose stools per day. About 3.9% passed one or more mucus or bloody stool per day (Table 5). Among the international tourists who experienced diarrhea, the concomitant symptoms were also reported. The common concerning symptoms of diarrhea were stomachache (74.0%), followed by weakness 43.3%. Both nausea/vomiting and headache/dizziness were equally accounted for 30.0%. For suspected cause of diarrhea, they thought that contaminated food, drinking water or ice cube and raw vegetable or fruit can be causative at 86.6%, 34.6 % and 30.7%, respectively. Only 14.2% thought that they got diarrhea from other cause such as stress, jet lag, chilly food. For suspected places where they got diarrhea, 66.8% reported that the suspected places were from hotel or restaurant. About 45% of them thought that food from street vendors can cause diarrhea, and 23.6% thought that food from fresh market can cause diarrhea.

About 39.6% of the diarrheal cases took rest without treatment, followed by 35.4% of cases took prepared medicine from their own country, about 23.6% of cases took Oral Rehydration Solution (ORS), and about 14.2% of the cases took medicine from drug store.

Table 5 Characteristic of diarrheal episode among international tourists (n = 127)

Characteristic	Number	Percent
Stool appearance		
≥ 3 loose stool per day	97	76.4
≥ 1 watery stool per day	25	19.7
≥ 1 mucus or bloody stool per day	5	3.9
Other symptoms [a]		
Stomachache	94	74.0
Weakness	55	43.3
Nausea / vomiting	47	30.0
Headache / dizziness	47	30.0
Cramp	24	18.9
Fever	20	15.7
Suspected cause of diarrhea [a]		
Food	110	86.6
Drinking water or ice cube	44	34.6
Vegetable or fruit	39	30.7
Others	18	14.2
Suspected place of getting diarrhea [a]		
Hotel or restaurant	81	66.8
Street vendors	57	44.9
Market	30	23.6
Treatment [a]		
Take rest with no treatment	47	39.6
Take medicine from own country	45	35.4
Take ORS	30	23.6
Go to hospital/health center	21	16.5
Others	18	14.2

[a] multiple responses

4.3 Pre–travel advice

Table 6 describes the information and pre-advice received before visiting Thailand. For general advice, most of the respondents (88.3%) received advice before departure. The majority of general advice (83.4%) was about geographic and climate, followed by socio–culture (73.1%), and 21.1% of the international tourists received other advice such as where to go, safety rules e.g. gem scams, and medicine.

For pre-travel health advice, the majority of them (82.3%) received it. Most of the participants (78.0%) received information about selecting food and beverage, followed by vaccination 68.9%, and approximately 61% of them received information about infectious and local endemic disease. Regarding the source of pre-travel advice, the majority of the respondents (74.9%) received from their friend, followed by from internet (39.7%). Only 5.7% received advice provided by the embassy.

Table 6 Information and advice received before visiting Thailand (n = 350)

Item	Number	Percent
General advice		
Yes	309	88.3
No	41	11.7
Information received[a]		
Geographic and climate	292	83.4
Socio–culture	265	73.1
Politic and economic	178	50.9
Others	74	21.1
Pre-travel health advice		
Yes	288	82.3
No	62	17.7
Information concerning health[a]		
Selecting food and beverage	273	78.0
Vaccination	241	68.9
Preventing insects and reservoirs	240	68.6
Infectious and local endemic disease	214	61.1

[a] multiple responses

Table 6 Information and advice received before visiting Thailand (continued)

Item	Number	Percent
Sources of advice[a]		
Friend	262	74.9
Internet	139	39.7
Travel agency	52	14.9
Embassy	20	5.7
Others	143	40.9

[a] multiple responses

Table 7 indicates the percentage of pre–travel advice by area of residence. Overall, more than eighty five percent of international tourists received pre–travel advice. Among the international tourists who received information, it was found that mostly received information concerning about geographic and climate. Followed by socio-culture at 70-80%. While the others information such as where to go, language, safety rules the Australian tourists received only 9.5%.

Regarding health information, most of the European tourists (84.2%) received pre-travel health advice while only 78.1% of the Asian tourists received health information. Further looking in more details; every country gave first priority on selecting food and beverage, followed by vaccination advice, except among Asian tourists.

Table 7 Pre–travel advice to tourists by area of residence (n=350)

Item	Area of residence (%)			
	Europe (n = 228)	Asia (n = 64)	America (n = 37)	Australia (n = 21)
General advice before travel				
Yes	202(88.6)	55(85.9)	34(91.9)	18(85.7)
No	26(11.4)	9(14.1)	3(8.1)	3(14.3)
Information received [a]	(n = 202)	(n = 55)	(n = 34)	(n = 18)
Geographic and climate	81.3	82.9	89.2	85.7
Socio–culture	70.3	72.8	81.1	71.4
Politic and economic	60.9	46.9	56.8	52.4
Others	32.8	18.4	24.3	9.5
Pre-travel health information				
Yes	192 (84.2)	50 (78.1)	29 (78.4)	17 (81.0)
No	36 (15.8)	14 (21.9)	8 (21.6)	4 (19.0)
Health information about [a]	(n = 192)	(n = 50)	(n = 29)	(n = 17)
Selecting food and beverage	80.3	73.4	78.4	66.7
Vaccination	77.2	37.5	73.6	66.7
Infectious and local endemic disease	61.4	59.4	56.8	71.4
Preventing insects and animal bites	69.3	64.1	75.7	61.9

[a] multiple responses

4.4 Overall international tourists attitude and behavior concerning food and beverage selection and consumption

Table 8 shows that about half (51.4%) of the international tourists had negative attitude towards food and beverage selection and consumption. Meanwhile, 88.6% had a need improvement level on food and beverage selection and consumption behavior.

Table 8 Overall international tourists attitude and behavior concerning food and beverage selection and consumption (n = 350)

Variable	Level of score (%)	
	Positive / Good	Negative / Need improvement
Attitude towards food and beverage selection and consumption	48.6	51.4
Behavior of food and beverage selection and consumption	11.4	88.6

4.5 Attitude towards food and beverage selection and consumption

Table 9 describes the details of attitude towards food and beverage selection and consumption of the international tourists. Approximately half of the respondents (53.1%) agreed with choose a clean restaurant for having meal. The majority of the respondents (41.7%) agreed with food from hotel or restaurant was cleaner than food from street vendors. Half of the international tourists (50.0%) agreed that well–cooked food may be contaminated when being served. About 41.7% of respondents agreed that they should peel fruit before eating by themselves.

About 64.0% of the international tourists agreed that having well–cooked food and steaming hot decrease the risk of getting diarrhea and 73.7% of them agreed that vegetable or fruit can cause diarrhea if we do not clean them properly. More than half of the participants (58.3%) agreed that safe drinking water should be logo and kept in a clean container, which certified by 'FDA'. Only 26% of international tourists agreed that tasting local food can increase getting diarrhea. Nearly half of the respondents (47.4%) agreed that consuming ice cube during traveling may cause diarrhea. Approximately 39% agreed that some seafood can be eaten with no cooking.

Table 9 Attitude towards food and beverage selection and consumption of international tourists (n = 350)

Statement	Level of attitude (%)		
	Disagree	Uncertain	Agree
Have a meal in a clean restaurant only can prevent diarrhea.	23.1	23.8	53.1
Hotel food is cleaner than from street vendors.	26.9	31.4	41.7
Well–cooked food may be contaminated when being served.	12.9	37.1	50.0
All fruit should be peeled by yourself before eating.	25.4	32.9	41.7
Having well–cooked and steaming hot decreases the risk of getting diarrhea.	8.0	28.0	64.0
Fresh vegetable and fruits are nutritious but if we don't clean them properly we will risk in getting diarrhea.	5.7	20.6	73.7
Safe drinking water should be kept in a container that has certified logo from Thailand 'FDA[a]'.	8.0	33.7	58.3
Tasting local food increase the risk of diarrhea.	37.4	36.3	26.0
Consuming ice cube during traveling may cause diarrhea.	19.4	33.2	47.4
Some sea food can be eaten safely with no cooking[b].	25.4	35.2	39.4

[a] ' FDA' stands for Food and Drug Administration.
[b] negative question

4.6 Food and beverage selection and consumption behavior

Table 10 shows details of selection and consumption food and beverage behavior of international tourists traveling in Koh Lanta. Of the 350 international tourists, 36.0% always wash their hands before having meal. Most of them (71.4%) always wash their hands after using toilet. The majority of the respondents (75.7%) always drank water in a sealed container, and 30.6% of the respondents always selected drinking water that has 'FDA'. certified clean logo.

Nearly 45% of the respondents always brought drinking water while traveling. Only 20.9% of the international tourists always peeled fruits by themselves before eating. There were 30.9% of the respondents always drank fresh juice in a restaurant. For eating fresh vegetable or salad in a restaurant, about 29.1% of the international tourists always ate. To try some local food that have never tasted before, only 8.6% of respondents always tried and only 12.6% of them always choose restaurant or hotel that had certificate of "clean food good taste" for meal.

Table 10 Food and beverage selection and consumption behavior of international tourists (n = 350)

Statement	Level of behavior (%)			
	Never	Some–times	Often	Always
Hand washing before having meal.	3.1	27.2	33.7	36.0
Hand washing after using toilet.	0.3	8.6	19.7	71.4
Drinking water in a sealed container.	8.6	6.3	9.4	75.7
Choose only drinking water that has certified by the ' FDA[a]'.	18.0	31.1	20.3	30.6
Bring drinking water in a sealed bottle with you whenever you travel.	22.6	17.4	15.1	44.9
Peel a fruit by yourself before eating.	13.7	43.4	22.0	20.9
Drink fresh juice only in the clean restaurant.	12.0	34.3	22.9	30.9
Eat fresh vegetable or salad from a clean restaurant only.	12.6	31.7	26.6	29.1
Try some local food that you have never tasted before.[b]	29.7	37.4	24.3	8.6
Choose to have a meal at a restaurant or hotel that obtain 'certificate' of clean food good taste.	35.7	39.1	12.6	12.6

[a] ' FDA' stands for Food and Drug Administration

[b] negative question

4.7 Health information needs

Table 11 describes health information needs of the international tourists during the trip by level of health information needs. About 63% of the international tourists need garbage bin and sewage system at tourist attractive destination, followed by need about safety equipment such as life-saving jacket or floater at 59.1%. Providing hospital staff who can communicate in English or other languages 54.9%, and 52.0% of them need 24-hour emergency telephone service.

Table 11 Health information needs of international tourists (n = 350)

Statement	Level of health information needs(%)		
	Low	Moderate	High
Displaying of ' Standard Food Certificate' in every restaurant.	28.9	36.0	35.1
Availability of 24–hour emergency telephone service.	10.9	37.1	52.0
Giving brochure concerning local endemic disease and prevention.	20.8	32.3	46.9
Providing health insurance by tour agencies during travel in Thailand.	24.3	36.0	39.7
Providing garbage bin and garbage disposal at every tourist attraction.	12.8	24.3	62.9
Providing hospital staff who can communicate in English or any other language.	12.8	32.3	54.9
Having adequate number of toilets at tourist attraction.	15.1	34.0	50.9
Having safety equipment i.e. life-saving jacket / floater.	13.5	27.4	59.1
Limiting number of tourists who travel by boat to prevent accidents.	19.4	32.9	47.7
Having warning sign in dangerous area i.e. 'be ware of jellyfish, deep zone water'.	23.4	30.3	46.3
Controlling speed limit of all transport vehicles strictly	25.4	32.3	42.3
Having check–point to stop drunk drivers to prevent an accident.	27.7	23.1	49.2

Other recommendations

Only 41 out of 350 international tourists gave suggestions on the open-ended question. About 5% of all study subjects reported that the beach should be cleaned whole year round, not only in tourist season. Approximately 5% said that free public drinkable water should be provided in tourist areas in order to improve hygienic conditions and reducing plastic containers. In addition, all recyclable garbage should be recycled. Nearly 2% suggested that service personnel in the tourist areas should be trained to improve his/her English competence.

4.8 Univariate analysis of international tourists by general characteristics, attitude and behavior concerning of food and beverage selection and consumption with diarrheal illness

General characteristics, attitude and behavior of international tourists

General characteristics included sex, age, area of residence, journey type, duration of stay, pre–travel advice about health information, and travel directly to Koh Lanta. As can be seen from Table 12, there were statistically associations between area of residence, journey type, and duration of stay in Koh Lanta and diarrheal illness.

Overall, international tourists who came from western countries were more likely to got diarrhea than Asian tourists, especially tourists from America (OR = 4.62, 95% CI = 1.90–11.22) and Europe (OR = 2.38, 95% CI = 1.22-4.62). For journey type, international tourists who traveled by self-arrangement were more likely to get diarrhea than group tour (OR = 5.46, 95% CI = 1.24–23.88, p-value = 0.024). Regarding to duration of stay in Koh Lanta, the longer duration of stayed in Koh Lanta, the higher risk in getting diarrhea, especially the international tourists who stay at Koh Lanta more than one month were 4.9 times increase of TD risk (OR = 4.91, 95% CI = 2.3–10.37, p for trend < 0.001).

Table 12 Univariate analysis of international tourists by general characteristics, attitude and behavior concerning food and beverage selection and consumption with diarrheal illness (n = 350)

Variable	Total	Diarrhea		^	95% CI	p–value[b]
		Yes n (%)	No n (%)	OR		
Sex						0.531
Male	199	75 (37.7)	124 (62.3)	1.15	0.74–1.79	
Female	151	52 (34.4)	99 (65.6)	1.00		
Age (years)						0.076
17 – 29	154	66 (42.9)	88 (57.1)	1.55	0.77–3.10	
30 – 44	150	46 (30.7)	104 (69.3)	0.91	0.45–1.85	
45 and over	46	15 (32.6)	31 (67.4)	1.00		
Area of residence						0.008
America	37	20 (54.1)	17 (45.9)	4.62	1.90–11.22	
Australia	21	8 (38.1)	13 (61.9)	2.41	0.83– 7.04	
Europe	228	86 (37.7)	142 (62.3)	2.38	1.22– 4.62	
Asia	64	13 (20.3)	51 (79.7)	1.00		
Journey type						0.024
Self-arrangement	330	125 (37.9)	205 (62.1)	5.46	1.24–23.88	
Group tour	20	2 (10.0)	18 (90.0)	1.00		
Duration of stay (days)						<0.001[c]
4 – 7	72	13 (18.1)	59 (81.9)	1.00		
8 – 14	60	23 (38.3)	37 (61.7)	2.82	1.27-6.25	
15 – 30	141	51 (36.2)	90 (63.8)	2.57	1.29-5.14	
31 and over	77	40 (51.9)	37 (48.1)	4.91	2.32-10.37	
Experience on traveling abroad						0.382
No	40	12 (30.0)	28 (70.0)	0.73	0.36–1.49	
Yes	310	115 (37.1)	195 (62.9)	1.00		
Received pre-travel health advice						0.192
No	62	18 (29.0)	44 (71.0)	0.67	0.37–1.22	
Yes	288	109 (37.8)	179 (62.2)	1.00		
Travel directly to Koh Lanta						0.062
No[a]	285	110 (38.6)	175 (61.4)	1.77	0.97–3.24	
Yes	65	17 (26.2)	48 (73.8)	1.00		
Attitude						0.065
Negative	180	57 (31.7)	123 (68.3)	0.66	0.43–1.03	
Positive	170	70 (41.2)	100 (58.8)	1.00		
Level of behavior						
Need improvement	322	120 (37.3)	202 (62.7)	1.78	0.74–4.32	0.200
Good	28	7 (25.0)	21 (75.0)	1.00		

[a] refers to visiting other places before arriving Koh Lanta in this trip
[b] from Pearson's chi-square [c] p for trend

4.9 Multiple logistic regression of diarrheal illness among international tourists

To adjust for all others variables effecting travelers' diarrhea, 10 variables were simultaneously analyzed by unconditional multiple logistic regression. Table 13 shows that two variables were statistically associated with diarrheal illness among international tourists. Significant predictors were duration of stay in Koh Lanta (adjusted OR = 5.7, 95% CI = 1.87–11.35; p for trend = 0.007) and attitude towards food and beverage selection and consumption (adjusted OR = 0.50, 95% CI = 0.30 – 0.83).

Table 13 Crude and adjusted odds ratio (OR) of diarrheal illness among international tourists' from multiple logistic regression (n=350)

Variable	Crude		Adjusted[a]		p-value
	$\hat{}$ OR	95%CI	$\hat{}$ OR	95%CI	
Duration of stay in Koh Lanta (days)					0.007[b]
4 – 7	1.00		1.00		
8 – 14	2.82	1.28 – 6.25	2.92	1.01 – 5.85	
15 – 30	2.57	1.29 – 5.13	2.79	1.00 – 4.85	
31 and over	4.91	2.32 –10.37	5.70	1.87 –11.35	
Attitude					0.007
Positive	1.00		1.00		
Negative	0.66	0.43–1.03	0.50	0.30– 0.83	

[a] adjusted for all variables in the model.
[b] p for trend

CHAPTER V

DISCUSSION

The discussion is presented as the following: 1) Prevalence of diarrhealness among international tourists at Koh Lanta District; 2) Association between international tourists' general characteristics and diarrheal illness; 3) Association between international tourists' attitude towards food and beverage selection and consumption and diarrheal illness; 4) Association between international tourists' behavior of food and beverage selection and consumption and diarrheal illness; and 5) Health information needs of international tourists.

5.1 Prevalence of diarrheal illness of international tourists

The occurrence of travelers' diarrhea depends on who you are, where you go, and how you live (59). Concerning who you are, not only does the country of origin play a role but also do a history of previous travel, and age. Concerning where you go, the incidence depends more on the quality of sanitation facilities than on climate (40). The tourists from low risk countries are significantly get sick more frequently than those tourists from high risk countries (59). Similar to the study of Black (6), Okhuysen, Ericssion (11), and Pelttola (22) the results of this study showed that diarrhea are a major health problem for international tourists.

Of 350 international tourists, 35.7% got diarrhea. The prevalence of diarrhea in this study is higher than the study of Steffen et al (10). They conducted a survey in December 1975 – March 1977 by using self-administered questionnaire with 16,568 tourists from Swiss and German during their flights home from 13 destinations in various climatic region included Thailand. The occurrence of travelers' diarrhea was

22.3% after trips in Thailand. In addition, Echeverria et al. (43) reported the prevalence of diarrhea in U.S. troops deployed to Thailand in February 1993 was 28%.

The prevalence of TD in this study was higher than previous studies in Thailand (35.7% vs. 22%, 28% respectively). The difference of prevalence rate might be due to: First, difference defining the definition of TD resulted in different classification of TD and non-TD cases, this study defined travelers' diarrhea as the passage of $\geq$ 3 loose stools or 1 watery stool or 1 bloody stool in a 24-hour period. In association with at least 1 symptom of enteric disease such as nausea, vomiting, abdominal pain or cramp, fever and tenesmus. In the study of Steffen (36) TD was defined in three levels: 1) classic TD which was the same definition as this study; 2) Moderate TD was passage of 1 to 2 unformed stools with at least 1 additional symptom or more unformed stools with out additional symptoms. 3) Mild TD was passage of 1 to 2 unformed stools without additional symptoms.

Second, the year of study is also important, as regions may have improve or deteriorated due to the world climate that affecting the occurrence of diseases included TD. Third, the studies were carried out in different areas and different groups.

In this study the prevalence of TD might be overestimated due to several reasons. First, this study was conducted in a seaside area. Therefore, the international tourists were tended to consume seafood that may cause TD. Data was collected from international tourists during summer in Thailand that is a seasoning variation of diarrhea epidemic. Second, the questionnaire was provided in English language only. Therefore, this cannot reflect the composition of the international tourists. Some excluded subjects due to language barrier might get diarrhea during the trip in Thailand. Third, all cases were self-reported. No stool samples were collected from

the respondents with diarrhea for laboratory evaluation of the etiology of TD bacterial and parasite enteropathogens. This may cause misclassification in some cases.

5.2 Association between international tourists' general characteristics and diarrheal illness

This study is one of a few studies to assess risk factors of travelers' diarrhea among international tourists. Univariate analysis showed that three factors were statistically associated with diarrheal illness i.e. duration of stay in Koh Lanta, area of residence, journey type.

Duration of stay in Koh Lanta

This study revealed that the longer duration of stay increased risked of TD. International tourists who stay more than one month were 5.7 times increased risk of TD as compare to stay 4–7 days (adjusted OR = 5.7, 95% CI = 1.87-11.35; p for trend = 0.007). The result confirmed the study of Cobelens et al (51) among a cohort of 743 Ducth short-term traveler (1-6 weeks) to various sub-tropical areas. The risk of TD increased according to duration of stay. Although the confidence interval of this OR included 1, p value was near-significant association between travel duration and TD (OR = 1.37, 95% CI =0.82-2.29 for duration 5-6 weeks vs. 1-2 weeks). The reason may be due to that the longer stay duration increased the chance exposed to contaminated food and beverage with enteropathogens that caused TD.

Area of residence

The tourists' origin appears to be importance risk factor of acquiring travelers' diarrhea. The results in this study showed that international tourists from western countries were more likely to got diarrhea than Asian (OR = 4.62, 95% CI = 1.90-11.22 for America vs. Asia; OR = 2.38, 95% CI = 1.22-4.62 for Europe vs. Asia). The finding confirmed the studies of Steffen et al (10) and Taylor et al (41) have demonstrated low attack rates for travelers' diarrhea among persons from developing countries who had travel to other developing countries. In addition, the attack rates for travelers' diarrhea are highest among persons from industries or developed countries who travel to tropics or sub-tropics or developing countries (15). The reason may be due to the difference between immunity to enteropathogens of Westerners and Asians. Also, the difference between types of food and beverage (20).

Journey type

For univariate analysis of this study, it was found that journey type was significantly associated with TD. International tourists who travel by self-arrangement have 5.49 times increased risk of TD as compared to group tour (OR = 5.46, 95% CI = 1.24-23.88, p =0.024). The result was consistent with the study of Cobelens et al (51) found that Dutch travelers who travel with organized tour reduced the risk of TD by 1.4 times. In addition, travel guides are more capable than individual travelers to pick relatively safe restaurants. On the other hand, tourists with tour leader may be more likely to avoid health risks in general, which may be reflected in their choice of food. In addition, they received advice from the tourist company (52).

Travel experience abroad and directly to Koh Lanta

Kean (59) reported that experience tourists suffered less than neophytes. Angst et al (20) explained that experienced travelers might eat and drink more carefully or they might have partial immunity by repeated exposure to pathogens as previously reported (20). Cobelens (51) found in Dutch tourists that a history of more than 12 months of travel to tropical destination reduced the risk of TD by 2.5 times. However, the result of study was not consistent with Cobelens. It was found that international tourists who have travel experienced tended to increase risk of TD by 1.37 (=1/0.73). The reason might be due to that the answer of this question was recorded in dichotomous (yes or no), not in duration of travel experience.

International tourists who directly travel to Koh Lanta tended to increase risk of TD as compare to tourists who travel other places first (OR = 1.77, 95% CI = 0.97-3.24, p-value = 0.062). This might be the study was conducted in seaside area. Therefore, the international tourists were tended to consume seafood or beverage that may caused TD.

Age

The result of this study confirmed the studies of Black (6) and Steffen et al (10) had showed that the risk of travelers' diarrhea increased in younger age group (15–29 years). The risk in the age group 17-29 years was the highest as compare to other age groups although crude OR included 1 (OR = 1.55, 95% CI = 0.74 – 3.29). Explanations for this finding could be that behavior of younger tourists regarding food hygiene may vary across the world. Therefore, different studies found the different degrees of association between age and travelers' diarrhea risk. Black (6) and Steffen

et al (10) found that increasing age was relatively protective against TD for most destinations. Another reason may be due to the presence of some immunity in the older tourists (20).

Received pre-travel health advice and sources of advice

In this study, there was no statistically association between received pre-travel health advice and TD ($p > 0.05$). Explanations might be the quality of advice they received. In addition, the tourist who seeks pre-travel advice from a travel medicine specialist might have chronic diseases that reduce the immunity to TD (66). However, tourists should be encouraged to comply with avoidance measure to prevent an illness can be severe and adversely impact their plans. Previous studies represented that tourists with diarrhea who had pre-travel health advice were more likely to self–medicate appropriately than tourists with diarrhea who had no such advice (67). Routine pre-travel advice for tourists to common travel destinations can be provided by family doctor but doctor need to update their knowledge regularly with adequate source of information. The main source of pre-travel advice in this study came from their friend concerning food and beverage selection and consumption. Health advice provided by the travel agent has been show to be rarely provided and can not be extrapolated safely for the tourists(66).

Sex

This study confirmed the results of Black (6) and Steffen et al (10) and Echeverria et al. (47) that male and female were not different in risk of getting TD (OR = 1.15, 95% CI = 0.74-1.79, p-value = 0.532).

5.3 Association between international tourists' attitude towards food and beverage selection and consumption and diarrheal illness

The result of this study showed that 39.4% of international tourists agreed some attitude e.g. an attitude about eating raw seafood, 37.4% disagree that tasted local food increase the risk of diarrhea. Overall attitude, more than half of them (51.4%) had negative attitude towards food and beverage selection and consumption during travel in Koh Lanta. Results showed that international tourists who had negative attitude were 0.5 time of getting TD as compared to positive (adjusted OR = 0.50, 95% CI = 0.30-0.83). However, the number of international tourist in both groups was almost the same. This implied that both groups were have the same chance of getting diarrhea. The reverse results may due to the language barrier in fill up the questionnaire. In part may due to the nature of sensitivity of attitude itself even though the questionnaire was well pretested.

5.4 Association between international tourists' behavior of food and beverage selection and consumption and diarrheal illness

This study was to examine the food and beverage selection and consumption behavior of international tourists during travel in Koh Lanta. Most international tourists took their meals in the hotel or bungalow where they stayed. The results of this study shown that 35.7% of tourists never choose to have meals at restaurant that obtain 'certificate of clean food good taste', only 12.6% of them always do. It indicates that choosing safe place to eat in developing countries is difficult, even a restaurant in tourists attraction (35). To try some local food that tourists never taste

before, 37.4% of them have sometimes. For overall behavior, 88.6% had a need improvement level on food and beverage selection and summation. Univariate analysis showed that there was no statistical association between behavior and TD ($p>0.05$). However, international tourists who had need improvement behavior were 1.78 times tended to got TD as compared to good behavior although the confidence interval included 1 (OR =1.78, 95% CI = 0.74-4.32, p = 0.20). The reason might be that the nature of sensitivity of rating scale questionnaire even though it was well pre-tested. In part might due to language barriers to fill up the questionnaire. In addition, all cases were relying on self-reported. This might be resulted in misclassification in some cases. Therefore, the results of this study fail to demonstrate the association between behavior and TD. However, health promotion to through mass media still need to modified the health behavior of the international tourists.

5.5 Health information needs of international tourists

In this study, most of international tourists (62.9%) needed management about sewage disposal or trash bin in every corner. Many suggestion about these that keep the environment clean or keep the beach clean in low season, recycle plastic bottles and drink cans, do not dump thing in the sea. More than half of international tourists (59.1%) needed having safety equipment i.e. life-saving jacket/floater or about safety such as limiting number of tourists who travel by boat, limiting boat speed. More than half of international tourists (54.9%) needed hospital staff or drug store can communicate in English, or learn a bit more English. These reflects lead to improve the quality of local people or nature in order to entice tourists to visit again without no fear of the development of diarrhea or other illness.

CHAPTER VI

CONCLUSION AND RECOMMENDATIONS

This analytical cross-sectional study was aimed to estimate the prevalence and determine the selected factors associated with diarrheal illness of international tourists in Koh Lanta District, Krabi Province. Data was collected through self-administered questionnaire that was pre-tested at Patthaya from April 1st to May 30th.

Conclusion

Of 350 international tourists, about 57% were female. The age ranged from 17 to 76 years with the mean of 32.6 years. About 65% came from Europe. Almost all of the international tourists (94.3%) traveled by self-arrangement. Duration of stay ranged from 4 to 330 days with the median of 20 days. Of the 127 cases (35.7%) experienced with diarrheal episode during this trip, 76.4% had 3 or more loose stools per day. The symptoms associated with diarrhea were stomachache (74.0%) and weakness (43.3%). About 87% reported that the suspected cause of diarrhea was food. Approximately 67% reported that hotel or restaurant was the suspected place where he/she got diarrhea. Only 23.6% reported taking ORS, whereas 35.4% took medicines from their own countries. In relation to pre-travel advice, 88.3% received general information advice such as geographic and climate (83.4%). About 82% reported that he/she received pre-travel advice on health. The most popular source of advice was friends (74.9%).

With regard to international tourists' attitude towards and behavior of food and beverage selection and consumption, 51.4% had negative attitude, while 88.6% had need improvement behavior. Regarding health information needs, 62.9% suggested providing garbage bin and good sewage disposal system in tourist area. About 60% suggested having safety equipment such as floater, life-saving jacket, 54.9% needed hospital staff could communicate English, 52.0% needed the availability of 24 hour telephone advice service for privacy call, about half (50.9%) needed adequate number of toilets at tourist attractive areas.

For univariate analyses, three variables were found statistically associated with occurrence of diarrhea in international tourists. International tourists from America and Europe were more likely to get diarrhea than from Asia (OR = 4.62, 95% CI = 1.90–11.22 for America vs. Asia and OR = 2.38, 95% CI = 1.22–4.62 for Europe vs. Asia). International tourists who traveled by self-arrangement were more likely to get diarrhea than those traveled by group tour (OR = 5.46, 95% CI = 1.24–23.88). Furthermore, international tourists who stay longer day in Koh Lanta were more likely to get diarrhea than those who were stay shorter (OR = 4.91, 95% CI = 2.32–10.37, p for trend <0.001).

The results from unconditional multiple logistic regression indicated that after adjusting for all other variable in the model, two variables were statistically associated with diarrheal illness among international tourists. Significant predictors were duration of stay in Koh Lanta (adjusted OR = 5.7, 95% CI = 1.87 – 11.35; p for trend = 0.007) and attitude towards food and beverage selection and consumption (adjusted OR = 0.50, 95% CI = 0.30 – 0.83).

Recommendations from this study

On the basis of the finding in this study, the following issues should be considered for improving the prevention for diarrheal illness among international tourists.

1. Of the 127 international tourists getting diarrhea, only 23.6% took ORS, 39.4% took rest with no treatment. About 35% took medicine from their own countries. According to several widely accepted treatment guidelines (7). Tourist who got diarrhea should take oral fluids to replace fluid lost and electrolytes such as fruit juices, soft drinks without caffeine and salted crackers. Therefore:

1.1) Concise information concerning how to prevent them from diarrhea and the use of Oral Rehydration Solution (ORS) or other electrolytes should be emphasized in leaflet given to the tourists.

1.2) ORS must be available not only at the health facilities in Kah Lanta but in hotel, guesthouse or any other accommodations for rent to the tourists, included even in the grocery and gift shops.

2. About 27% of tourists disagreed that hotel food was cleaner than street vendors. In other words, 27% of tourists did not trust the cleanliness of food in hotel. Therefore, Koh Lanta District Health Office responsible staffs in conjunction with other organizations concerned should work hands in hands to solve the problem:

2.1) Perform spot check the cleanliness of food and beverage in hotels, restaurants and street vendors. Promote the "Clean food good taste" sign and ' FDA' certified clean logo to the international tourists

2.2) Provide adequate garbage bins, sewage system and safety equipment at attractive destination. Keep the tourist area clean whole year round.

2.3) Provide hospital staffs who are proficiency in English.

3. International tourists who came from western country especially from America and Europe seem to be more likely to get diarrhea more than Asian tourists. As a result, health office should be more focus on diarrhea surveillance among these particular groups.

Recommendations for further study

1. The occurrence of diarrheal illness may be varying among different tourist area, season climates and other environments. The research should be conducted in different tourist places and other time periods throughout a year. Having more sample size can help to validate the results.

2. Qualitative methods such as in-depth interview and participant observation should be applied for future study to elicit the complex behaviors and other factors affecting diarrheal illness and health information needs of international tourists.

3. Follow up study should be carried to determine the attack and incidence rates. Stool samples should be collected for laboratory evaluation to identified etiology of TD bacterial and parasite enteropathogens.

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APPENDICES

APPENDIX A

Request for participation

Dear, Participatants

My name is Manit Chaninporn. I am a postgraduate student major in Infectious Disease, at Mahidol University, Bangkok. My research title is "Diarrheal illness and health information needs of international tourist". This study aimed to estimate the prevalence of diarrhea, attitude towards and behavior of food and beverage selection and consumption and health information needs of international tourists during traveling in Koh Lanta District. You are requested to participate in this study. Your information will be useful to improve service programs for international tourists. All responses will be treated with confidentially.

Thank you in advance for your kind co–operation.

Yours sincerely,

Manit Chaninporn

Faculty of Public Health

Mahidol University,

Bangkok.

ID. No_____
Date_____

Questionnaire

Title : Diarrhea illness of International tourists.

Part 1 General characteristics
Instruction Please fill in the blank about yourself or mark ✔ into ( ) .

1. Country of residence _____.Age _____ years. Sex ( ) male ( ) female

2. Marital status ( ) single ( ) married ( ) widowed / divorced / separated ( ) others(specify)____

3. Education level ( ) primary school ( ) high school ( ) diploma
( ) bachelor degree or higher ( ) others(specify)_____

4.Occupation ( ) self-employed ( ) employee ( ) unemployed /student
( ) civil servant ( ) retired ( ) others(specify)_____

5. Travel style ( ) self – arrangement ( ) group tour

6. Have you ever been to any other countries besides Thailand ? ( ) no ( ) yes

7. Have you ever come to Thailand prior to this time ? ( ) no
( ) yes, how many time?_____

8. Have you received any advices about Thailand before coming? ( ) no **[skip to Q.12]**
( ) yes

9. If yes, where did you receive from ? **[can answer more than 1]**
( ) tour agency ( ) Embassy ( ) friend ( ) Internet ( ) others(specify)_____

10.What advices did you receive ? **[can answer more than 1]**
geographic & climate ( ) no ( ) yes
socio-culture ( ) no ( ) yes
politic & economic ( ) no ( ) yes
others(specify)_____

11. Did you receive any advices on health? ( ) no ( ) yes

What kind of topics have you received ? **[can answer more than 1]**
selecting food and drinking water ( ) no ( ) yes
vaccination ( ) no ( ) yes
infectious & local endemic diseases ( ) no ( ) yes
preventing insects & carrier ( ) no ( ) yes

12.For **this trip** , Did you visit other places before you come to Lanta island?
( ) No, I directly came here.
( ) Yes, I visited other places of Thailand . Where? _____
( ) Yes, I visited other country . Where? _____

13. Accommodation at Lanta island ?
( ) bungalow ( ) hotel
( ) relative's or friend's house ( ) camping ( ) guest house

14. How long have you been in Thailand **for this trip**? _____ days.

15. Do you have health insurance **for this trip**? ( ) no ( ) yes

16. Have you ever got sick from the following symptoms **during this stay in Thailand** ?
[can answer more than 1]

fever	( ) no	( ) yes
headache	( ) no	( ) yes
flu-like symptoms	( ) no	( ) yes
itchy	( ) no	( ) yes
stomachache	( ) no	( ) yes
nausea / vomiting	( ) no	( ) yes
others _____		

17.Have you ever got diarrhea during this trip? ( ) no **[skip to part 2]** **page 3** ( ) yes

17.1 In case you got diarrhea during this trip, what was/is the stool appearance?
( ) 1 - 2 loose stool / day ( ) ≥ 1 mucus or bloody stool /day
( ) ≥ 3 loose stool / day ( ) ≥ 1 watery stool / day
what are / were the following symptoms **[can answer more than 1]**
( ) weakness ( ) headache / dizziness ( ) fever
( ) nausea / vomiting ( ) stomachache ( ) cramp

17.2 Treatment when you got diarrhea **[can answer more than 1]**
( ) take prepared medicine from your own country.
( ) take ORS (Oral Rehydration Salt)
( ) take rest with no treatment
( ) go to clinic or hospital
( ) others (specify)_____.

17.3 In your opinion, what are the causes of getting diarrhea in Thailand and where did you get it?
[can answer more than 1]
(please ✔ causes and identify places of having it)

Causes	Place		
	Fresh market	Street vendors	Hotels / restaurants
( ) food			
( ) drinking water			
( ) vegetable / fruit			
( ) others			

Part 2 Attitude towards selection and consumption during traveling.
Instructions Please read the following sentences and choose the level of attitude given in the list.

Statements	Agree	Un - certain	Dis - agree
1. Tourist should to have a meal in a clean restaurant only .			
2. Hotel food is cleaner than food from street vendors.			
3. Well-cooked food may be contaminated when being served.			
4. For safety, all fruits should be peeled by yourself before eating.			
5. Having well-cooked and steaming hot food decreases the risk of getting diarrhea.			
6. Fresh vegetables and fruits are nutritious, but if we do not clean them properly we will risk getting diarrhea.			
7.Safe drinking water should be kept in a container that has a certified logo from the Food and Drug Administration (FDA).			
8. Tasting local food increases the risk of diarrhea.			
9. Consuming ice during travelling may cause diarrhea.			
10. Some seafood can be eaten safely with no cooking e.g. oysters.			

Part 3 Selection and consumption behavior during traveling.
Instructions Please read the following sentences and choose the type of behavior given in the list.

Statements	Always	Often	Some times	Never
1. You wash your hands before having a meal.				
2. You wash your hands after using the toilet.				
3. You buy drinking water in a sealed container.				
4. You choose only drinking water that is certified by the ' Food and Drug Administration'.(FDA)				
5. You bring drinking water in a sealed bottle with you whenever you travel.				
6. You peel all fruits yourself before eating.				
7. If you want to drink fresh juice you will have it only in a clean restaurant.				
8. You eat fresh vegetables or salad from a clean restaurant only.				
9. You try some local food that you have never tasted before.				
10.You choose to have a meal at a restaurant or hotel that has obtained a 'Standard Food Certificate'.				

Part 4 **Health information needs of the international tourists.**

Instructions Please read the following sentences and choose the needs level given in the list.

Statements	High	Moderate	Low
1. Displaying of 'Standard Food Certificate' in English in every restaurant.			
2. Availability of 24-hour emergency telephone service.			
3. Giving brochure concerning local endemic diseases and prevention.			
4. Providing health insurance by tour agencies during travel in Thailand.			
5. Providing garbage bin and garbage disposal at every tourist attraction.			
6. Providing hospital staff who can communicate in English or other language.			
7. Having adequate number of toilets at tourist attractions.			
8. Having safety equipment i.e. life-saving jacket / floater.			
9. Limiting number of tourists who travel by boat to prevent accidents.			
10. Having warning sign in dangerous area. i.e. 'be ware of Jelly -fish', deep water zone', etc.			
11.Controlling speed limit of all transport vehicles strictly.			
12.Having check-point to stop drunk drivers to prevent an accident.			

If none of the above statements serve your health need, please indicate.

_____

_____

Recommendations_____

_____

If you have any problems while travelling, please contact the Tourist Service Center

Tel: 1155 (Free 24 Hrs.)

Thank you very much and we wish you enjoy your trip.

BIOGRAPHY

NAME	MR. Manit Chaninporn
DATE OF BIRTH	December 26, 1967
PLACE OF BIRTH	Samutprakran, Thailand
INSTITUTION ATTENDED	Srinakharinwirot University, 1989-1991
	Bachelor of Education (Health Education)
	Rajabhat Institute Rajanagarindra 1996-1998
	Bachelor of Education (English)
	Mahidol University, 1999-2002
	Master of Science (Public Health)
POSITION & OFFICE	1995-Present, Koh Lanta District Health Office,
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